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Sustainable Development in the Third World: An Assessment of the Conservation Actions in South Africa, Brazil, Malaysia, and Madagascar

Carol Rizkalla

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by
Carol Rizkalla

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Advisor: Rafael de Sa

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INTRODUCTION

C.S. Lewis once said, "What we call Man's power over nature turns out to be a power exercised by some men over other men with Nature as its instruments" (Guimaraes 1991: 39). This is truly how we have attained our present civilization. Development in the first world has included changes in the structure of social classes, culture and value modifications, the evolution of political and power structures towards democracy, and a rise in the average living standards. This could not have been achieved without the modernization of agriculture, industrialization, urbanization, and technology. The most important requirement for development, however, is the extraction of natural resources. Thus, we have arrived at the current ecological crisis. Biodiversity, the variety and variability of all living organisms, provides the basis for life on earth. It is estimated that the world is currently losing species at a rate at least 1000 times faster than normal evolutionary rates, primarily due to exploitation by one species, man. The proximate causes are clear: deforestation, overheating, air and water pollution. Solutions may also be clear, simply enact stricter laws and set aside protected areas. The ultimate cause is overpopulation for which the solution is not so clear. The third world harbors the majority of the planet's biodiversity as well as the highest population growth rates. As these countries strive to develop and secure an adequate standard of living for their peoples, how can we prevent them from making the same destructive mistakes to the environment as the first world has? For we cannot strip developing nations of their sovereign right to development.

Prior to 1980, development and conservation were thought to be incompatible objectives. This view was challenged with the concept of sustainable development which requires that the goals of economic and social development be defined in terms of sustainability and limitations imposed by the ability of the environment to meet present and future needs (IUCN/UNEP/WWF 1991: 4). The conservation of biodiversity has become one of the major goals of sustainable development. In June 1992, Agenda 21 was adopted at the United Nations Conference on Environment and Development (better known as the Earth Summit), signifying an international agreement to increase efforts for sustainable development and conservation:

> Underlying Agenda 21 is the notion that humanity has reached a defining moment in its history. We can continue our present policies which serve to deepen the economic divisions within and between countries; which increase poverty, hunger, sickness and illiteracy worldwide; and which are causing the continued deterioration of the ecosystem on which we depend for life on Earth. Or we can change course. We can improve the living standards of those who are in need. We can better manage and protect the ecosystems and bring about a more prosperous future for us all (United Nations 1992:1).

The deterioration of the environment is now a global phenomenon and despite the many agreements in Rio, there is little global cooperation. According to the World Bank, "Overall, progress in the past [six] years clearly has not been what we have hoped. Investment in sustainable development has been inadequate as has been the cost-effectiveness of some of the investments" (The World Bank 1997: 3). The new approach is community-based conservation which arises at the community level, rather than nationally or internationally. It focuses on the people who bear the costs of conservation. Communities want to regain control over natural resources to improve their economic well-being. This approach to conservation involves biodiversity protection by, for, and with the local community. Conservationists are now optimistic with the implementation of community-based conservation, but the problem remains that governments are often unwilling to give up their responsibility of resource management. And communities are no longer isolated as they once were, participation in the global market is a strong pressure to further exploitation. But we must remember that though not all bottom-up approaches based on community participation succeed, almost all top-down projects that exclude community involvement fail (Western and Wright 1994).

The United Nations Environmental Programme has published a quite lengthy *Global Biodiversity Assessment* which provides a scientific analysis of the current issues regarding biodiversity with a global perspective. It addresses specific countries and regions solely as examples to a general concept. The fact of the matter, however, is that we have to examine specific countries because the notion of state sovereignty runs deep within each government. Interstate cooperation is increasing in regards to certain issues such as protection of the ozone and acid rain. I know of no parks or reserves, however, which cross national boundaries. Thus, I have begun the task of the country assessment, delving into their history and future. The state is

increasingly cooperating with businesses and nongovernmental organizations for improving and adding new protected areas. Jeffrey McNeely (1995), head of the World Conservation Union, provides ten principles for improving these partnerships so that they may improve management:

1. Provide benefits to local people.
2. Meet local needs.
3. Plan holistically.
4. Plan protected areas as a system.
5. Define objectives for management.
6. Plan site management individually, with linkages to the system.
7. Manage adaptively.
8. Foster scientific research.
9. Form networks of supporting institutions.
10. Build public support.

These principles are important to keep in mind as we look at the four case studies below. Why have I chosen Brazil, Madagascar, Malaysia, and South Africa to study out of the many possibilities? Though the first world is not immune from ecological disaster, the threat is much more imperative within the third world. Norman Myers identified ten hotspots of biodiversity in tropical forests, areas which exhibit high rates of endemism which are also under the greatest threat of destruction. The four countries were chosen at random of this list of hotspots. We will clearly see commonalities in the causes of deforestation in each country. "Holding the small farmer responsible is tantamount to 'blaming the victim,' because the real causes are likely to be poverty, unequal land distribution, and low agricultural productivity combined with rapid population growth" (Mahar 1989: 2-3). The message to be taken is that efforts to reduce deforestation through parks, zoning, or legislation, are not likely to succeed if economic incentives encourage people to do the opposite.

BRAZIL

Brazil's territory encompasses 3.3 million square miles and contains 160 million inhabitants. The population is growing at 1.6% per year. Life expectancy is 67 and the infant mortality rate is 44 per 1000 live births. Annual GNP in 1995 was 579,787 million US dollars, while GNP per capita is $3,640 (The World Bank 1997). Urban centers contain 75% of the population. New economic programs developed from 1990 onwards are redirecting Brazil

toward macro-economic stabilization, privatization, deregulation, and further liberalization of the foreign trade regime, with the aim of integrating Brazil into the growing world markets. Productivity and technological innovation are encouraging foreign investment. With a large natural and human resource endowment, Brazil has the most diversified industrial base among developing countries and ranks as the tenth largest economy in the world (Brazil 1998). The Brazilian Amazon, covering only 6% of the world land area, is the richest ecosystem on Earth. Though trees are cleared everyday, it remains the least disturbed rainforest, with West Africa having already lost 72% of its rainforest, and southern Asia 63% (Hall 1989). 1988 Landsat images indicate 12% of Amazonia has been cleared. It is seen as the planet's natural filter, and because of this, Brazil is probably the under the most pressure by other nations to increase protection. Before we discuss the protections Brazil has established, we must understand the roots of deforestation.

The main causes of deforestation in Amazonia are small-scale agriculture, cattle ranching, logging, road building, hydroelectric development, mining, and urban growth. It appears that agriculture is the greatest culprit, though the most recent data available is from 1980. Approximately 6% of the rainforest has been converted for raising crops, and 11% for livestock, leaving 83% undisturbed. This represents a three-fold increase over the 1970 data, so it is safe to assume that the increase in the past eighteen years is devastating to the forest. It is difficult to assess the impact of logging because much timber extraction is a by-product of clearing for agriculture, though it also satisfies the demand of industrialized nations for tropical hardwoods. Deforestation, regardless of the cause, was minimal until the 1960s and 70s when government policies were designed to open up Amazonia for human settlement and economic activity. Massive road-building programs made large areas accessible by land for the first time. Settlement schemes attracted migrants from around the country. Fiscal incentives and subsidized credit lines encouraged cattle raising. These acts initiated under the military regime, collectively known as Operation Amazonia, emphasized industrialization. Little thought was given to a development strategy.

The operation included the 1964 construction of the Belem-Brasilia highway, expanding 1900 kilometers across the Amazon. The 1970 National Integration Program planned for the construction of three more highways spanning some 15,000 kilometers. Not only would this create jobs and alleviate population pressures, valuable mineral deposits would hopefully be uncovered. But by the end of the decade, the number of families that had been resettled was less than 40% of the government's target, and no sizable mineral deposits had been found. The failed establishment of self-sustaining agricultural communities can be attributed to bad planning. Only about 3% of the soils in the area are naturally fertile and most of the area is hilly. As a result, cleared land eroded rapidly, which necessitated expensive maintenance work on the highway, and the burning of additional rainforest to restore soil fertility. The alteration of the forest also created favorable breeding conditions for the *Anopheles* mosquito, the most common vector of malaria (Mahar 1989). Though the highways opened up the forest for development, ironically, the lack of minerals and fertile soil protected the forest from even more development.

Interestingly, conservation agencies have been active in Brazil, even during the military regime. The First Brazilian Conference for the Protection of Nature took place in 1934 in Rio. Half of the national parks and biological reserves were established between 1937 and 1961, encompassing over 1 million hectares of protected land, flora and fauna. Environmental groups emerged as early as 1948. In 1978, a program of environmental stations was started used solely for preservation and ecological research. One of these, the Mamiraua Ecological Station, protects the varzeas, the flooded forest which covers 2% of Amazonia. This station is unique because it successfully integrates preservation with sustainable development of the sixty resident communities (Sociedade et al 1996). 1981 saw the creation of a National Policy for the Environment and a National Council for the Environment. But still, only 1.5 % of Brazil's total area was officially protected by the mid-1980s (Guimaraes 1991). Among the main elements of Brazil's environmental policy, it should be stresses that:

1. The protection of Brazil's environment for present and future generations is a common responsibility of the Sate and the community;
2. Every citizen is entitled to a sound environment and to participate in the environmental management process;

3. Property rights and economic activities must be consistent with, and not detrimental to, the protection of the environment;
4. The federal government shall set standards for environmental quality, issue rules regulating the granting of permits for activities that may pollute or harm the ecosystems where they are carried, and define conservation strategies for the main Brazilian ecosystems;
5. State and local governments have broad regulatory autonomy on matters related to environmental protection and environmental quality initiatives, within the limits set forth by the constitutional provisions and federal legislation in force (Brazil 1998).

On paper, Brazil has everything it needs for effective conservation. What was missing was community involvement.

The extractive reserve provides an example of sustainability and a rejection of monoculture. These reserves overcome the problems of land distribution and agrarian reform in that it fulfills the social purpose of the land by guaranteeing the legal rights of those who were already entitled in practice because they lived there traditionally. Operation Amazonia threatened the extractive activities of these traditional peoples who made their living primarily by rubber tapping and collecting nuts. In 1976, the rubber tappers began to organize in protest of their own forced resettlement. Chico Mendes, murdered in 1988 after the creation of three extractive reserves, became the martyr of this movement. In his words,

> We realized that in order to guarantee the future of the Amazon we had to find a way to preserve the forest while at the same time developing the region's economy. So what were our thoughts originally? We accepted that the Amazon could not be turned into some kind of sanctuary that nobody could touch. On the other hand, we knew it was important to stop the deforestation that is threatening the Amazon and all human life on the planet. We felt our alternative should involve preserving the forest, but it should also include a plan to develop the economy. So we came up with the idea of extractive reserves (Mendes 1989: 41).

The main objective of an extractive reserve is to improve the living conditions of the residents. Some estimates indicate that the annual income of an extractive family amounts to the equivalent of US $ 2,370 including subsistence hunting, the rearing of domestic animals, food crops, and the extraction of products such as rubber and nuts. According to these figures, a rubber tapper's average income is more than double the minimum wage paid in the towns. On the other hand, adequate health care and sanitation is lacking and more schools need to be built. Overall, however, the extractive reserve represents a balance between development, conservation, and

social justice (Murietta and Rueda 1995). It should be modeled by other nations, for example, on the Native American reservations of the United States.

In addition to the Amazon, Brazil's Atlantic Forest is perhaps the most striking example of a conservation hotspot, already heavily fragmented and under continued threat. The region has been logged since its settlement in 1500 by the Portuguese for warships and merchant vessels. The only forest of significance remains in the privately owned Una Biological Reserve in the state of Bahia where cocoa is grown in the shade of the native canopy. This region holds the world record for tree biodiversity per hectare. The diversity is threatened however, for the cocoa market crash has left the workers looking for new direction in the economy. Farmers may choose to clear the area for cattle pasture. Conservation International has publicized the results of their cost-benefit analysis, that logging and cattle ranching are poor investments, to the local farmers. Ecotourism provides the best investment. In cooperation with the Institute for Socio-Environmental Studies in Southern Bahia, CI is developing a model ecotourism site with a canopy walkway spanning the treetops of a forest adjacent to the Una reserve. Agroforestry and aquaculture programs have also been established. Another threat has arisen with the federal government's plan to pave a road into a previously isolated area of the Atlantic Forest. In response, CI and the Bahian government will create the Serra do Conduru State Park, which will protect the forest along the road, and will double the area of protected forest in the region. (Conservation International 1997). There is constant battle between scientists and politicians. Were it not for the efforts of CI, it is likely the whole forest would be cleared. So what is the federal government doing?

In 1996, Brazil "put the world to shame" by placing a moratorium on new mahogany and virola logging for two years. Randall Hayes, executive director of the Rainforest Action Network was quoted, "No country has ever done this much to save the world's rainforests. Now the United States must live up to this standard and ban all imports of mahogany and other threatened rainforest timbers" (Hatch and Westlund 1996). More recently, Brazil pledged to earmark 10% of its forest for protection by the year 2000, so that it would adhere to the Parks

and Nature Reserves Project of the World Wide Fund for Nature. This signifies the tripling of Brazil's protected area within three years. The announcement appears to have been under pressure, as the government was accused of covering up the latest data on deforestation rates (Reuters 1997). Whether the announcement was only meant to appease environmentalists or the government will actually strive for 10%, it seems that with this announcement, the remaining 90% is open for destruction. According to the Brazilian ambassador, "While acknowledging the importance of the so-called 'global' environmental problems such as climate change, depletion of the ozone layer, and loss of biodiversity, we do not want to lose the opportunity to advance our national priorities: sanitation, trash collection and disposal, water distribution systems, access to proper sewage treatment, and cleaner industrial technologies" (Brazil Constitution 1998). While community based conservation is advancing in Brazil, the government appears to be interested in development without the sustainable.

MALAYSIA

Malaysia, a confederation of thirteen states covering 127,317 square miles, consists of two distinct areas: Peninsular Malaysia and East Malaysia located on the northern part of the island of Borneo. The majority of the population, just over 20 million, lives on the Peninsula, while only 15% live in the states of Sabah and Sarawak on Borneo. The people represent a number of ethnic groups-Malays, Chinese, Indian, the indigenous Orang Asli and various tribes of Borneo. Population growth is 2.5%. Life expectancy is 71 and infant mortality is 12 per 1000 live births. The 1995 GNP was 78,321 million US dollars and per capita income was $3,890. According to this data, Malaysia appears to be growing out of the Third World category, but it is still ravaged by some development problems. As an Asian tiger (along with Korea, Taiwan, Hong Kong, and Singapore), before the recent market collapse, economic growth occurred through the export of tin, natural rubber, and palm oil. East Malaysia is a major supplier of timber, oil, and pepper (World Bank 1997; Wheeler et al 1991). While it still exports these natural resources, Malaysia is now the greatest exporter of semiconductors. With lower crime

rates, lower drug use, and greater family stability than Western democracies, leaders believe the balance of global power is shifting in their direction (Reid 1997). Thus, the statement that the third world should not make the same mistakes as the first, is perhaps the most appropriate in regards to Malaysia.

Malaysia gained its independence from Britain in 1957. Its colonial history, as in most developing nations, is a large factor in explaining the modern state. The colonial administration laid the foundations for a large-scale resource-based economy, principally the growing of rubber on large plantations and the mining of tin. Rubber had been transplanted from the Amazon in the late 1800s as a commercial crop. The indigenous peoples, known as the Bumiputra (sons of the soil), had little contact with these new industries. Most of the revenues from the exploitation went to Britain. The importation of Chinese and Indian labor resulted in severe income inequalities between racial groups at independence. The first government was faced with expanding development, reducing poverty, and uniting the people. The emphasis was placed on economic growth and rural infrastructure. Virgin forest was opened up to provide land for small-scale farmers. More land was also opened for the planting of oil palm to supplement the rubber export. Despite these economic achievements, racial disparities still remained. The New Economic Policy was thus formulated in 1970. This was basically an affirmative action plan designed to help the Bumiputra gain economic equality. More land was opened, villages were modernized, and employment quotas were established. The policy worked. Distribution of wealth is no longer as skewed, and society is much more stable.

During this period, for the first time development plans made explicit the need for the government to ensure the compatibility of environmental conservation with development. The government was aware of the deterioration occurring in the advanced industrial countries. In 1974, the Department of Environment in the Ministry of Science and Technology was established. Broad environmental policies were laid out in the Third Malaysia Plan (1976-1980) and more specific issues were addressed in subsequent plans. The Sixth Malaysia Plan (1991-1995) addressed sustainable development, emphasizing that all initiatives to improve

competitiveness in the world economy have the assurance that the environment can support growth and development (National Steering Committee 1992). Malaysian government knows what it has to do to protect its natural resources, but it appears they do not believe they have reached crisis stage. As Reid recounts optimistically:

> Balancing the environment and the economy is not always easy, but Malaysia has been relatively lucky in the way development occurred. The initial thrust was mainly agricultural-first rubber, and then vast plantations of oil palm, a tree with mahogany-red fruit that produces and oil valuable in food and soap (hence Palmolive). Since the 1960s thousands of square miles of virgin forest have been burned to make way for oil palm. The Malaysian Nature Society argues this is a loss to the environment. No plantation can be as vigorous or as varied as a tropical rainforest, with as many as a thousand different plant species per acre. Still, if there must be economic development, a plantation is less intrusive than, say, an aluminum smelter or a shopping mall encircled by parking lots. Industrial and office parks are springing up near many Malaysian cities, and here and there stretches of green are giving way to suburban sprawl... But even today fully half of Malaysia is natural forest cover, and it is, overall, a lovely tropical land (1997: 120).

The forests of Malaysia have been systematically managed since 1901, but it wasn't until 1978 that the Selective Management System, which incorporates environmental needs in harvesting regimes, was established. As of 1990, 58.7% of forest remains, estimated at 19.3 million hectares. Half of Sarawak, however, is zoned for selective logging with nearly 150 companies licensed to fell for timber (Reid 1997). Commercial logging represents a greater threat to the Malaysian forest, rather than agricultural expansion as in Brazil. Malaysia is a major tropical hardwood supplier to the industrializes world, a role they took on after the forest resources in Africa were depleted. At the current rate, the World Bank estimates that all of the remaining virgin forest on Malaysian Borneo will be gone by the year 2000 (Rainforest Action Network 1991). 2.74 million hectares have been designated as protective forest, and 1.39 million hectares as national parks and wildlife sanctuaries. The first park was actually established by the British in 1938. In total 4.3% of the land area is protected. Peninsular Malaysia, however, is a hotspot of diversity, containing over 8000 species of flowering plants including the tallest tropical tree and the largest flower, and amazingly as many as 20,000 species of moth. Approximately 30% of the species are endemic to the region. Many areas have been proposed for protection, with the most important area being the lowland forests of Endau-Rompin, perhaps

the last refuge for the Sumatran rhinoceros (Wheeler et al 1991). Whether more land will be protected is not known.

Malaysia's strongest policies currently address pollution, a reflection of their observations of the industrial world. They believe there has been no significant long-term impact from the conversion of the forests for agriculture and logging. Nevertheless, Malaysia has assembled a steering committee which guides the states in incorporating sustainable development into their project planning. There are over forty pieces of environment-related legislation. As in most countries, however, awareness of environmental issues is generally found among the more educated and professionals in urban areas. To an extent, this has been addressed by the inclusion of "Man and his environment" as a subject in upper primary schools (National Steering Committee 1992). The problem appears to be the lack of recognition of Malaysia's natural heritage. Any news coverage rainforests receive seems to focus on the Amazon. Malaysia has a rich environment, and its protection is not a priority. In addition, current protections do not appear to involve the local community. A hopeful factor is the growth of tourism which will create the economic incentive to preserve virgin forest. On the other hand, Malaysia also wants to increase population growth (Reid 1997). But we have already seen that agricultural expansion does not affect the forest as much as commercial logging. For the case of Malaysia, it is the first world which can save the forests, by reducing the demand for luxury items.

MADAGASCAR

Madagascar, formally the Malagasy Republic, is the fourth largest island in the world covering 228,000 square miles. The population of nearly 14 million is composed of eighteen ethnic groups. Population growth is 3.1%. Life expectancy is 52 and infant mortality is 89 per 1000 live births. The GNP is 1995 was 3, 178 million US dollars while per capita income was only $230 (The World Bank 1997). Small-scale agriculture dominates the economy with 85% of the population in rural areas, but exports include coffee, vanilla, rice, sugar, beef, chromite, and graphite. Unfortunately, relatively little socio-political analysis of Madagascar is available. The

island gained independence from France in 1960. The first government and those following had three major goals: the achievement of national unity; the attainment of economic development and diversification; and the establishment of a democratic government. It is clear that the first two goals remained elusive and the ensuing democracy was limited in scope. Madagascar is one of the least developed countries in the world. Living conditions vary considerably between the rural and urban populations. Literacy remains low and the incidence of disease high (Nelson et al 1973). There is no question that this island is at the crisis point.

Of the total land area, about 14% is wooded and 9% is unusable. The rest has been converted to grazing or crop land. Pastureland is usually communal. When the population of a village has outgrown the available land, satellite villages will usually form to cultivate new fields. The effect of population pressure can be seen in the increasing fragmentation of land, declining soil fertility, and deterioration of yields. Traditional cultivation practices included the slash-and-burn method. Once it was learned that this results in low yields, devastates the forests, destroys other vegetation cover, and promotes erosion, it was made illegal. Irrigated rice paddies and terracing is endorsed instead. Despite the possible penalties of fines or imprisonment, slash-and-burn continues because irrigation is too expensive (Nelson et al 1973). This has brought the remaining forests of Madagascar to a critical state. The species richness of the island, known for its lemurs but also includes nearly 8000 endemic species of flowering plants, is now concentrated in the rainforest of the east coast. In total, 90% of the species are endemic. 75% of the original wildlife habitat has been lost to subsistence farming and cutting for fuel. The last remaining tracts of primary forest, within three reserves, are found on steep slopes with rugged terrain, or they have escaped destruction because the population density in this area is relatively low. Landsat images reveal that deforestation has occurred within the reserve boundaries (Green and Sussman 1990).

Conservation is not a new concept to Madagascar. When David Attenborough visited the island in 1962 to film the unique wildlife, he also wanted to bring some specimens to the London Zoo. The Director of the Scientific Institute responded

> I am sorry but I must ask you not to catch any lemurs whatever. It is forbidden by law for anyone to kill one or even to keep one as a pet. Of course, we have not the staff to enforce such a law throughout the whole of Madagascar so our officials and those from the Forestry Department have been trying to persuade people that it is wrong to harm lemurs. Now, at last, we are beginning to have success. But if you now begin to catch the animals, and to get the people to help you to do so, they will believe that there is one law for the white foreigner and one for the native, and much of our work will be undone. I ask you, as a naturalist with a concern for wildlife, to do as I request and not to hinder our attempts to conserve these rare animals (Attenborough 1962:18).

Beginning in April 1995, an assessment of Madagascar's scientific and conservation priorities was undertaken by a coalition which included Conservation International, The United Nations Development Program, a German primate center, and the Anthropology Department of a university on the island. This laid the groundwork for Madagascar's National Environmental Action Plan. The first stage of the process was a priority-setting workshop of which the principle finding was that many areas of outstanding biodiversity are located outside protected areas, mostly in the southern part of the island The necessity of corridors between protected areas was also agreed upon, to maintain gene flow and exchange of species. The second stage was a stakeholder consultation integrating scientific findings with local views. The net result of the process was the adoption of a landscape approach to conservation which integrates regional planning, biodiversity monitoring, and institutional strengthening. $155 million in donor support will be channeled to Madagascar over the next five years (Hannah 1997). Conservation planning has entered a crucial phase. Green and Sussman (1990) gave their recommendations: "Sustainable agriculture and agroforestry to provide local inhabitants with needed food and fuel, accompanied by reduction of population growth, are among the prerequisites for effective tropical rainforest preservation. Detailed ethnographic studies addressing the social and economic needs of local peoples are needed if these efforts are to succeed." Madagascar represents the crisis mentality of man. This island is not working towards prevention, but rather the cure. The stakeholder consultation involved local communities in the plan. Perhaps that is the greatest step Madagascar had to take in its effort for sustainable development.

SOUTH AFRICA

The Republic of South Africa, divided into 14 regions, covers a surface area of 1,233,410 square kilometers (472,362 square miles) in which almost 42 million people live. The population growth rate is approximately 2.3% per year. Life expectancy at birth is 64 years of age, and the infant mortality rate is 50 per 1000 live births. 57% of the country is urbanized. Annual GNP in US dollars in 1995 was 130,918 million and GNP per capita was $3,160 (Department 1992: 7; The World Bank 1997: 17,37). As a middle income economy, South Africa represents a microcosm of the world with its diverse population which is classified as white, asian, black, or coloured. The black population represents some 73% of the total, 81% of whom live in dire poverty. Whites who comprise approximately 23% of the population hold 57% of the wealth. Despite these adverse statistics, all of them have shown improvement from just five years ago (Department 1992: 51). Past growth of the South African economy can be attributed to exploitation of non-renewable resources, specifically mineral sales. Future growth is expected to rely on the agricultural sector as it accounts for 12.3% of the GDP and 24.4% of those employed. There is however, a shortage of available arable land due to high levels of urbanization, industrial development, and mining. Land use is severely imbalanced through the Land Acts which reserved homelands for blacks (Department 1992: 54-55). Though the Acts have been repealed, access to agricultural lands is still distorted.

The Land Act of 1913 divided South Africa by allocating 87% of the land to the Dutch Afrikaners, and the remaining 13% to the more populous blacks. The "Native Reserves" or homelands were remote, barren, overcrowded, and entirely dependent on the republic for economic survival, resulting in ecological disaster. One USAID (U.S. Agency for International Development) official noted, "Many of the homelands bear more resemblance to the face of the moon than to the commercial farms and game preserves that cover the rest of the country" (Durning 1990:8). Environmental deterioration of the homelands has four causes rooted in apartheid policies: poor land, politically enforced overpopulation, labor shortage, and poverty.

The 13% of the land allocated to blacks is rocky with thin topsoil and scarce rainfall. Borders were drawn to exclude anything of value, especially fertile land and mineral resources. Most of the 29 million blacks were forced into these homelands while the rest lived in illegal squatter settlements on the city outskirts. The homelands experienced the highest birth rates in the country as blacks were denied access to education, health care, and family planning. White rural areas were one-tenth as heavily populated. 70% of homeland income came from unskilled wage earners commuting into the white economy. Thus, the homelands contain mostly children, the old, and the ill. 80% of homeland residents live beneath the poverty line. A 1986 study found that 95% of black earned less than $100 a month while 89% of whites earn more (Durning 1990: 11-14).

One of the effects that life in the homelands has had on the environment is a severe threat to South Africa's forests. Per capita consumption of fuelwood is 200-800 kilograms annually. Women typically trek six to nine kilometers every other day collecting loads of wood weighing 30 kilograms (Durning 1990: 10-12). Associated with this forest degradation is the decline of diversity and abundance of forest-dependent plant and animal species. In addition to fuelwood, plants are removed for building materials, traditional medicines, and ornamental carvings. In some areas, 80% of the forest has been cleared for timber extraction or grazing. Habitat destruction and fragmentation of the forests results in the decline of forest animals. Compared to most regions, South Africa's forests are relatively well protected. Public authorities, local administrative regions, and conservation NGOs protect 72% of the remaining forest. Only about 20% of these forests, however, are located within nature reserves, leaving the rest without patrols. The result is the continuance of commercial exploitation and uncontrolled poaching. On average, 68% of rural individuals hunt regularly, more often for recreation rather than subsistence. This poses a formidable threat to forest diversity, a large proportion of which is endemic to South Africa (Castley 1996: 36-41).

Poverty stricken blacks are not the only ones to blame for decline of biodiversity. The fynbos biome of the Southern cape is considered a "hotspot" for conservation. The fynbos biome

is known for its immense flora, giving South Africa the top rank among African countries for the most species of flowering plants (21,000) of which 80% is endemic. It ranks sixth globally. This region also has the highest region of threatened plants of any temperate region (Ledger 1991:234-235). The export of cut flowers from the fynbos region is a $125 million industry. Greater protection of this region is likely as it is a valuable attraction for tourism revenues.

What of other protections South Africa has made? The first game reserve was established in 1894, and by the turn of the century eleven more were proclaimed. There are currently more than 560 national parks and nature reserves covering approximately 6% of the area of the country. Over 92% of the animals are protected within this system, making it one of the most effective in the world. The incentive behind these conservation measures is primarily the tourism attracted to the wildlife, which provides South Africa with over one billion dollars in revenues (Ledger 1991: 235). There are a number of problems which surround these parks and reserves, however, which demonstrate the paradox of conservation and apartheid policies within the same government. The creation of the Tembe Elephant Park in 1983 was followed by the removal of 32 black homesteads, some of whom were not consulted about their move. They were relocated outside the park boundaries where there was no water supply, leaving cultivated fields and losing cattle along the way. They were promised access to the park to harvest natural resources, but this was later denied. And they received meager benefits from tourism. This forced relocation had occurred previously and it is still happening. The result of not consulting local peoples is a hostility towards conservation policy (AFRA 1991: 223-227). If one looks at it from the point of view of the rural African, it is clear that western conservation ideology conflicts with the needs of the impoverished.

In 1989, the head of the African National Congress' (ANC) Department of Economics and Planning, Max Sisulu, attributed environmental degradation to apartheid:

> The ANC believes that a rational ecological protection policy requires the dismantling of apartheid. Widespread overgrazing, soil erosion and serious land degradation in the so-called "homelands" constitute the inevitable destructive consequences to apartheid. These cannot be reformed or rehabilitated by land-use management measures without first dismantling apartheid. The ANC believes environmental reconstruction constitutes a major task of a free and democratic

> post-apartheid South Africa. Indeed, an environmentally conscious society can only exist in a free democratic political environment (Cock 1991: 12-13).

He also acknowledged the importance of community-based conservation, where communities perceive wildlife as an asset, and thus take it upon themselves to protect it. In addition, he said the ANC was strongly committed to combining economic development with environmental protection.

With the new democracy came new conservation legislation aimed at meeting international objectives, such as Agenda 21. Conservation is the responsibility of the relevant provincial agencies whose main objective is to foster an awareness of environmental issues in the general population. Some of the success stories, the increase in the white rhino population for example, can be attributed to these agencies (Department 1992: 141). There is immense participation in conservation agencies and government institutions, and there is a growing membership of blacks in the non-governmental organizations. In 1995, The State of the Environment Report was developed which is an electronic environmental system to be updated regularly. It contains indicators of the environment ranging from global warming, ozone, acid rain, women and the environment to landscape change, health hazards, infrastructure, population, and legislation. It allows for global comparisons and monitoring with maps, graphs, and animation. This system put South Africa in line with sustainability criteria developed by the United Nations (The State 1997). That same year, at the Agenda 21 African Regional Seminar it was suggested that local Agenda 21 programmes be developed in partnership with resident communities and NGOs. A regional Local Agenda 21 information network was established with its office in Zimbabwe, and Durban, Johannesburg and Cape Town have initiated Local Agenda 21 programmes (Urban 1997). Perhaps the most important initiative was the incorporation of sustainable development in the new constitution, adopted May 8, 1996. Chapter 2, the Bill of Rights, section 24 reads:

> Everyone has the right-
> (a) to an environment that is not harmful to their health or well- being; and
> (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

(i) prevent pollution and ecological degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (New Constitution 1997).

Is this enough? Will democracy and sustainability policies protect biodiversity while securing a prosperous future for South Africa? The homelands, near-wastelands, are still a reality. Land reform is crucial for a truly democratic South Africa. Large public investments in agricultural assistance, primary health care and family planning, soil conservation, and agroforestry can only slow the downward slide of the homelands. Only redistribution of white-owned farms can reverse it (Durning 1990: 37). South Africa cannot do this alone. International funding is necessary to truly abolish apartheid.

CONCLUSION

In the next three decades, with world population rising by 800 million per decade, energy and transport infrastructure of $500 billion per year in developing countries alone, and agricultural output doubling, the pressures on ecosystems will reach unprecedented levels. As we see from these four case studies, progress is slow. Then number of people living in poverty has not changed since the Earth Summit and only 7% of the world's land is officially protected, but this protection is in the form of "paper parks" (The World Bank 1997). Protected areas need to be expanded to at least 10%, they need to be protected seriously, and local communities need to benefit from their protection. Harrison (1997) calls this the Third Revolution. When early hunter-gatherers exhausted their supplies of wild game and crops, we had the agricultural revolution. The wood shortage in Europe forced the move to fossil fuels and minerals in the industrial revolution. The Third Revolution will reduce our impact on the environment to a sustainable level. However this occurs, it will abolish poverty and achieve social and economic development for the world's majority.

> There must be an end to absolute poverty, and improved distribution of land and other assets. We must work to make the international economic order more just. We must

> work to spread and perfect democracy and local control over the environment. We must free markets from unnecessary controls, while making them responsive to environmental and social costs.

Harrison has great faith that man's intelligence will once again enable him to survive potential disaster. He actually believes that the Third Revolution has already begun. At the conference on sustainable development in October, 1997, Gary Meffee began his presentation with an astute observation. The headlines of the morning paper on that day spoke of a stock market crisis. Meffe than asked his audience, "Why is nobody in a panic about the species lost yesterday, or the decline in ecosystem services, when the news speaks of the stock market decline of eleven points as a crisis?" Is this the state of a society ready to experience the Third Revolution? If we are not yet at the crisis level globally, we are very near it. One must only visit a third world nation to understand what this means. We cannot wait any longer before we act.

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